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**(71) Applicant(s):**

OERLIKON SURFACE SOLUTIONS AG, PFÄFFIKON [CH/CH]; Churerstrasse 120 8808 Pfäffikon (CH) *(for all designated states)*

**(54) Title (EN):** INSITU METAL MATRIX NANOCOMPOSITE SYNTHESIS BY ADDITIVE MANUFACTURING ROUTE

**(54) Title (FR):** SYNTHÈSE DE NANOCOMPOSITE À MATRICE MÉTALLIQUE IN SITU PAR VOIE DE FABRICATION ADDITIVE

**(57) Abstract:**

**(EN):** A unique and novel additive manufacturing route has been proposed to form a thermally stable in-situ metal matrix nano composite by interfacing reactive plasma in the selective laser melting process chamber. The proposed route gives very high compositional freedom, i.e. nitrides, carbides, oxides, silicides and other ceramics with different stoichiometries can be reinforced in nanoscale in any metallic matrix. Components with such a nanocomposite structure display superior high temperature structural properties.

**(FR):** L'invention concerne une voie de fabrication additive unique et nouvelle qui a été proposée pour former un nanocomposite à matrice métallique in situ thermiquement stable par interfaçage de plasma réactif dans la chambre de traitement de fusion au laser sélectif. La voie proposée permet une très grande liberté de composition, c'est-à-dire qu'elle permet de renforcer des nitrures, des carbures, des oxydes, des siliciures et d'autres céramiques ayant des stœchiométries différentes à l'échelle nanométrique dans une matrice métallique quelconque. Des composants ayant une telle structure de nanocomposite présentent des propriétés structurelles supérieures à haute température.

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**Declarations:**

Declaration made as to the identity of the inventor (PCT Rules 4.17(i) and 51bis.1(a)(i))

Declaration made as applicant's entitlement, as at the international filing date, to apply for and be granted a patent (Rules 4.17(ii) and 51bis.1(a)(ii)), in a case where the declaration under Rule 4.17(iv) is not appropriate